# Beach Garden Project

## Habitat Restoration by Students on the Monterey Bay Dunes 2006-2007

# Beach Garden Project

## Meaningful Watershed Education for Students

Sponsoring Organizations

Monterey Dunes Natural History Association

2004-2007

Chuck Haugen Conservation Fund

2007-2008

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# Summary of Work

The Beach Garden Project teaches dune restoration skills to 250+ students and 10 teachers yearly at public parks around the Monterey Bay. Hands–on activities include seed collection, propagation of seedlings, outplanting, and monitoring of restored areas. The restoration activities foster environmental stewardship and educate about the Monterey Dunes, the coastal watershed, and the Monterey Bay marine ecosystem.

# Partners

## California Department of Parks and Recreation

Locations: Carmel River Beach
Monterey State Beach
Seaside Beach
Marina State Beach
Salinas River State Beach

## Monterey Peninsula Regional Parks District

Locations: Aeolian Dunes, Sand City (Landfill Site)
Marina Dunes Preserve

# Audience

## TOTAL 280 students

Grade 1 (20)
Grade 2 (20)
Grade 3 (60)
Grade 4 (60)
Grade 5 (120)

120 students (from 2 schools)
220 students (from 3 schools)

> 60% low income
39-59% Hispanic


The Monterey Bay Dunes contain an unusual and beautiful mosaic of plant communities with unparalleled plant diversity.

Plant diversity provides food and shelter for many animal species

The Monterey Bay Dunes provide an important environmental barrier to ocean waves. Native dune species stabilize the sand with extensive root systems. Dune sands build up around the native species, creating small hummocks and eventually larger dune mounds. Native species help reduce coastal erosion by moderating the natural ebb and flow of dune sands.

Native species are well adapted to wind, salt spray, fog, and drought

picture of beach morning glory

Flexible stems are well adapted to windy conditions

picture of beach sagewort

# Threats to dune habitat

Development
Coastal erosion
Uncontrolled recreational use
Invasive non-native species

Non-native iceplant overtakes the native species, reducing habitat diversity. The dense mat-like growth of this non-native species prevents natural sand accretion, modifying the local dune topography to a flattened barren.

# Beach Garden Project Objectives

1) Students perform hands-on restoration science at public parks in the Monterey Dunes. 250+ students and 10 teachers (Grades 1-5)

- Collection of site–specific seed
- Propagation at schools (2500 seedlings)
- Outplanting of seedlings
- Monitoring of restored areas

2) Students and teachers learn about the Monterey Dunes, the coastal watershed, and the Monterey Bay marine ecosystem using the following materials:

- Power Point presentation
- Curriculum aligned with CA. State Standards (Grades 1-5)
- Interactive website

3) Students and teachers steward their local parks by restoring native species to degraded dune areas.

# Program questions/focus

Why are sand dunes important to Monterey Bay and its watersheds?

What are the factors that affect species in the Monterey Dunes?

How do species adapt to the exposed conditions of sand dunes?

What human factors impact dune habitat?

How do we preserve sand dune habitat and restore degraded areas?

How do we measure the success of restored areas?

# Instructional Time

Total time 10-12 hours/class

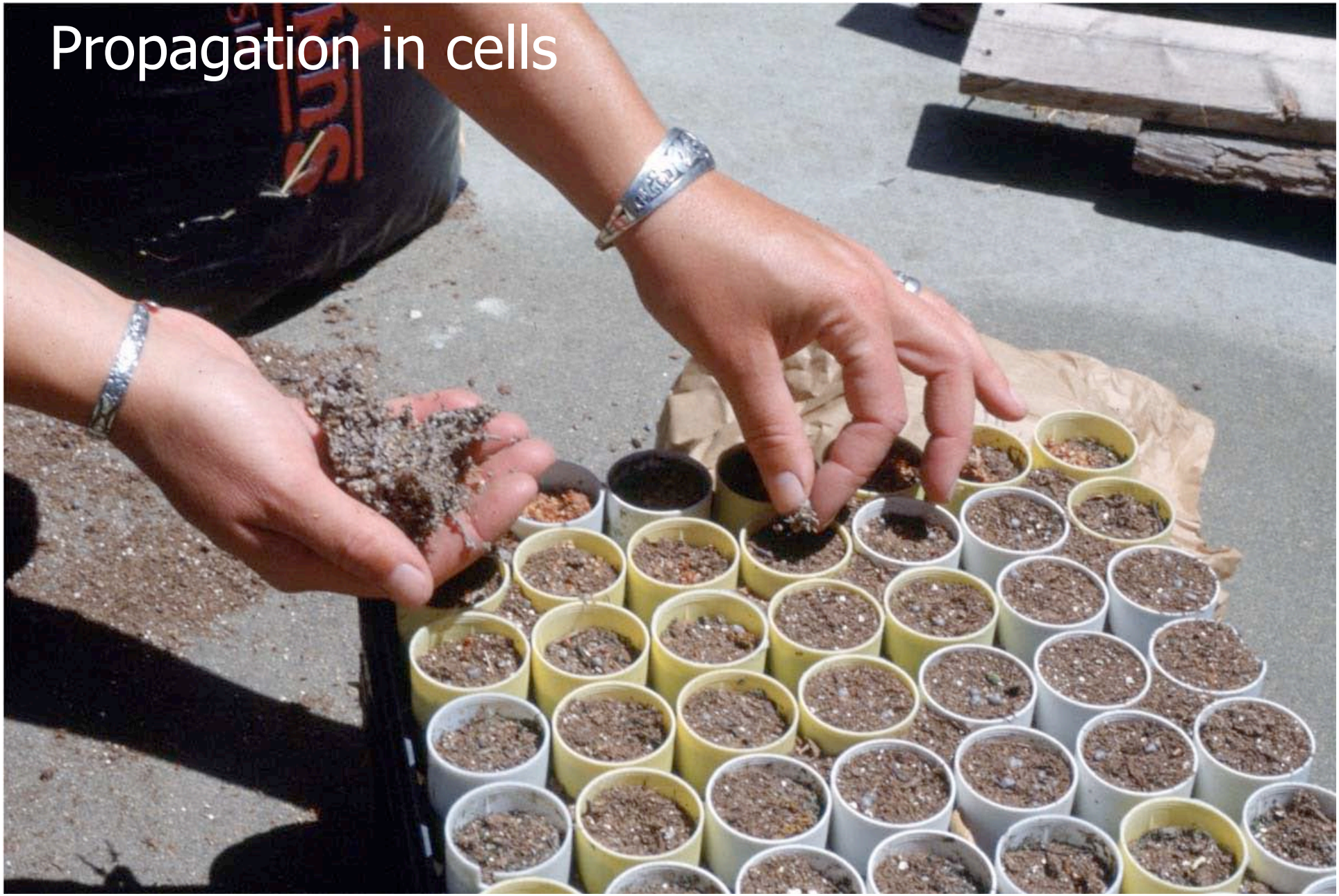
3-4 class sessions (2 hours per session)

2 fieldtrips (2-3 hours per trip)

| | | |
|---|---|---|
| Class | fall | Pre-test, slide show (dune formation, species, adaptations, threats) |
| Fieldtrip | fall | Seed collection (respect for habitat, collect, observe/ sketch plants) |
| Class | fall | Propagation (200 seedlings per classroom) |
| Class | winter | Thin seedlings, watershed pollution lesson |
| Fieldtrip | winter | Outplanting of seedlings (observe/ sketch, plant, animal tracks) |
| | or | |
| | spring | Sand crabbing or monitoring (measure plant cover) |
| Class | spring | Final review/ brainstorm environmental actions/post-test |


Gathering dune buckwheat seed
BUCKWHEAT

# Propagation in cells



# Outplanting


Observing and recording


Discovering
spider tracks

# Results

- Planted 1635 seedlings (from 2500 started)
  (students= 65% return, adults = 75% return)

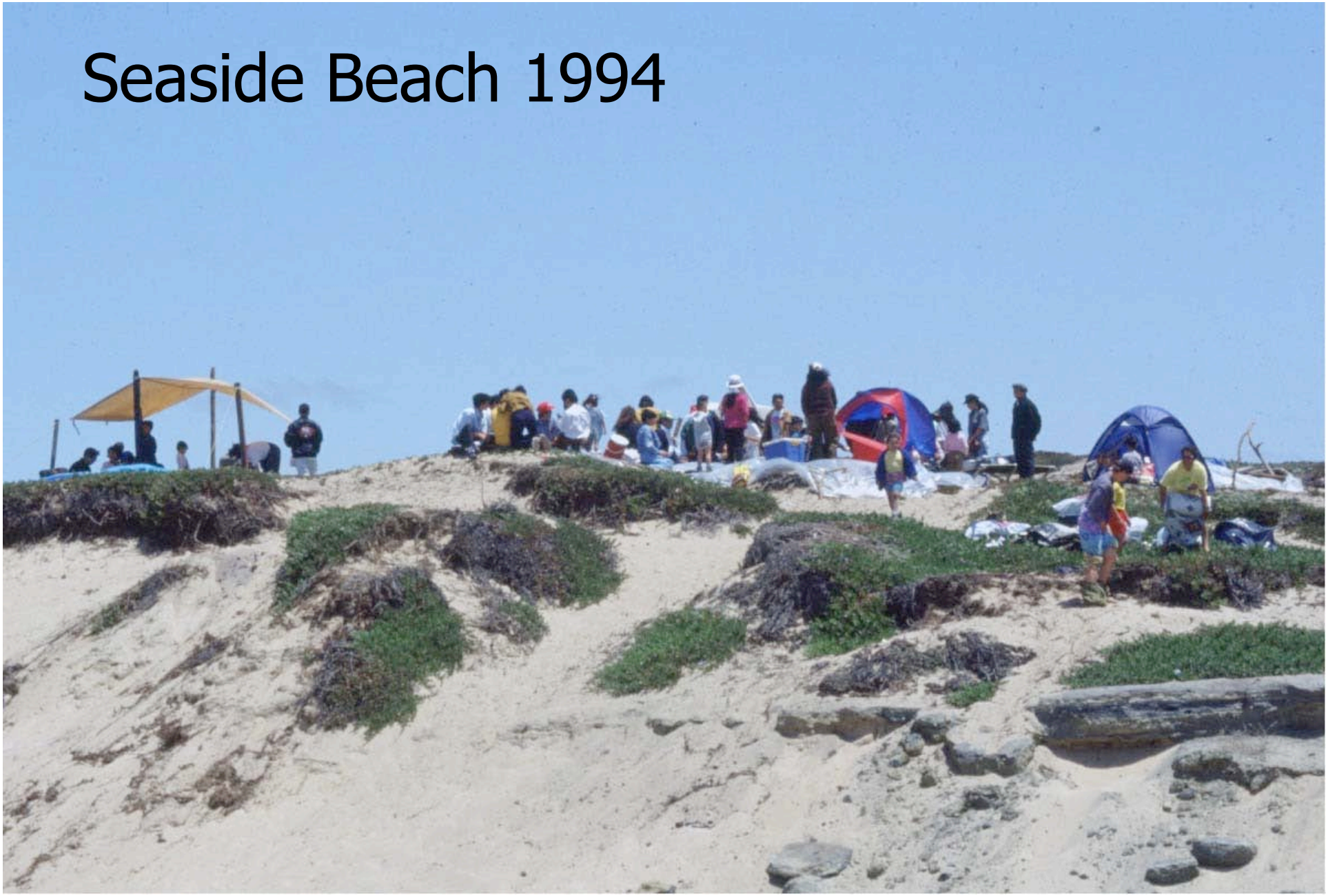
- Dune plants grow quickly, blooming landscape in 2-3 years

- Commercial value of student revegetation
  $1 per seedling grown and $1 per seedling planted
  = **$3270 value donated to State and Regional Parks**

- Cost per student (4 class sessions, 2 fieldtrips) = $120
- Cost per student using some parks staff = $75

- Intangible result of students getting excited about nature,
  dune habitat, and the Monterey Bay

# Seaside Beach 1994



# Seaside Beach today

# Products

Lesson plans aligned with CA. science standards
- seed exploration
- propagation
- outplanting
- scientific observation/ sketching

Worksheets adapted to local dune areas
- scavenger hunts
- animal tracks
- coastal erosion

Website – beachgardenproject.com

# Assessments

- Pre and post tests
  (Grades 4-5, 100 students)
  Knowledge - Multiple choice, true/false questions
  Environmental attitudes/ behavior- survey by rating

  Goal: Increase dune knowledge and environmental behaviors by 25%

- Tally planting skills during outplanting
  (50 students, all ages)

  Goal: Plant seedlings at 75% competency

# Assessments

## Methods/ Results

Tallied difference in pre/ post test scores by question.

Monterey Dunes knowledge increased by 20%

Environmental attitudes and behaviors improved by 7%

Planting at 80% competency (50 students)

# Beach Garden Project Knowledge Pre/Post-test

## *Grade 5*

1.Circle the best choice to finish this sentence.
Sand dunes are hills of sand that:

a. are moved by wind
b. never move

2) Circle the best choice(s) to finish this sentence.
Sand dunes provide:

a. a barrier to ocean waves
b. a place to have a picnic
c. habitat with food and shelter for wildlife
d. a home for sea mammals

2. Which sentence **best** describes native plants?

a. Native plants can grow anywhere.
b. Native plants offer food and shelter for wild animals.
c. Native plants are usually weeds.
d. Native plants don't provide anything people need.

3. Plants living in the coastal Monterey sand dunes must survive:

a. wind
b. salt spray
c. blowing sand
d. very little water
e. all of the above

4. Which of these plants is not native to the coastal Monterey sand dunes?

a. Sea thrift
b. Sagewort
c. Beach primrose
d. Ice plant

5. True or False? If false, rewrite the statement to make it true. True

Ice plant crowds out native plants in the Monterey area.

6. True of False? If false, rewrite the statement to make it true.

Smith's blue butterfly is endangered because the coastal dune habitat is endangered. True

7. True or False? If false, rewrite the statement to make it true. False

The endangered Smith's blue butterfly lives and feeds on ice plant.
The endangered Smith's blue butterfly lives and feeds on buckwheat.

8. Why do we want to restore native plants to the Monterey Dunes?

Place an X next to all correct answers.

_____x_____Native plants have deep root systems that hold the sand in place
_____Native plants taste good
_____x_____Native plants support an abundance of native birds, insects and reptiles
_____x_____ Native plants help the dunes build up which prevents storm waves from washing inland

9. List two things you can do to help take care of the Monterey Dunes or Monterey Bay.

# Beach Garden Project Behavior Pre/Post-test

| | **For each activity below, circle the response that best matches you.** | I do this all the time | I do this most of the time | I do this sometimes | I do this once in a while | I never do this |
|---|---|---|---|---|---|---|
| a. | Pick up trash | 5 | 4 | 3 | 2 | 1 |
| b. | Share what you know about nature with family and/ or friends | 5 | 4 | 3 | 2 | 1 |
| c. | Grow or plant California native plants | 5 | 4 | 3 | 2 | 1 |
| d. | Restore local natural habitats | 5 | 4 | 3 | 2 | 1 |
| e. | Conserve water by turning off the tap while soaping dishes or brushing teeth | 5 | 4 | 3 | 2 | 1 |
| f. | Recycle paper, plastic, glass, or aluminum | 5 | 4 | 3 | 2 | 1 |
| g. | Learn more about local wildlife or habitats | 5 | 4 | 3 | 2 | 1 |

| | **For each statement below, circle the response that best matches you.** How much do you like to…. | A lot | Some | A little | Not at all |
|---|---|---|---|---|---|
| a. | Spend time outdoors in nature (including the ocean, coast, slough or rivers)? | 5 | 4 | 3 | 2 |
| b. | watch wildlife or marine life at the ocean, coast, sloughs or rivers? | 5 | 4 | 3 | 2 |
| c. | learn about nature by reading, watching TV or searching the Internet? | 5 | 4 | 3 | 2 |
| d. | talk about nature (including the ocean, coast, sloughs or rivers) with your friends or family? | 5 | 4 | 3 | 2 |

## Beach Garden Project Post Test - Skills section

Tally students for competent restoration skills at the end of planting 5-10 seedlings:

| | Yes 1 | No 1 | Yes 2 | No 2 | Yes 3 | No 3 | Yes 4 | No 4 | Yes 5 | No 5 |
|---|---|---|---|---|---|---|---|---|---|---|
| Does student walk carefully through the dune habitat? | | | | | | | | | | |
| Does student follow planting directions? | | | | | | | | | | |
| Is seedling planted at: | | | | | | | | | | |
| proper depth? | | | | | | | | | | |
| tamped down? | | | | | | | | | | |
| with reservoir? | | | | | | | | | | |
| with wind protection wall? | | | | | | | | | | |
| Does student pick up the trash in the pathway? | | | | | | | | | | |

# Program Changes

- Review basics - plant structure, life cycles
- Develop vocabulary list for each lesson
- Added watershed pollution lessons
- Added fieldtrips: seed collection (fall), sand crabs (spring)

  Ideal staff ratio 1:8
- Some plants moved to greenhouses from school grounds
- Assessments:

  Pre/ post tests now 50% multiple choice, 50% open answer

  Increased testing from 100 to 180 students

# Thank You

California Department of Parks and Recreation

Monterey Dunes Coalition

Monterey Dunes Natural History Association

Chuck Haugen Conservation Fund

Barnet Segal Trust

Monterey Bay National Marine Sanctuary (NOAA)/ BWET